

THE ENERGY REPORT

Table of Contents

Chapter 1

Introduction	1
Diversifying Our Energy Portfolio	1
About This Report	2

Chapter 2

Overview	3
Energy Resource Trends	3
Texas Energy Consumption	4
Texas Primary Energy Sources	7
Energy by End Use Sector	10
Electricity Generation	10
Texas Energy Production	12
Energy Spending	14
Environmental Impacts	16
Water and Energy	20
Government and the Energy Industry	20
Outlook for Texas	21

Chapter 3

Overview: Non-Renewable Fuels.....	25
Introduction	25
Hydrocarbons	25
Coal	25
Uranium	26
From Source to Consumption	26
Electricity Production: U.S. vs. Texas	27
Direct Use	28
Transportation	28
Fuel Consumption	28
Texas Economic Impact	29
State Taxes and Revenues	30
Outlook for Texas	31

Chapter 4

Crude Oil.....	35
Introduction	35
Crude Oil in Texas	37
Costs and Benefits	47
Other States and Countries	55
Outlook for Texas	56

Chapter 5	
Natural Gas	63
Introduction.....	63
Natural Gas in Texas	64
Costs and Benefits.....	73
Other States and Countries	77
Outlook for Texas.....	77
Chapter 6	
Liquefied Petroleum Gas (LPG)	81
Introduction.....	81
LPG in Texas.....	81
Costs and Benefits.....	85
Other States and Countries	87
Outlook for Texas.....	87
Chapter 7	
Coal	89
Introduction.....	89
Coal in Texas	90
Costs and Benefits.....	94
Other States and Countries	99
Outlook for Texas.....	99
Chapter 8	
Nuclear Energy.....	105
Introduction.....	105
Nuclear Power in Texas	106
Costs and Benefits.....	111
Other States and Countries	117
Outlook for Texas.....	118
Chapter 9	
Overview: Renewable Energy	123
Renewable Energy Consumption in the U.S.....	123
Renewable Energy Consumption in Texas	125
Government Policies and Renewable Energy	126
Outlook.....	133
Chapter 10	
Solar Energy	137
Introduction.....	137
Solar Energy in Texas	138
Costs and Benefits.....	148
Other States and Countries	152
Outlook for Texas.....	153
Chapter 11	
Wind Energy	159
Introduction.....	159
Wind Power in Texas.....	161
Cost and Benefits.....	170
Other States and Countries	176
Outlook for Texas.....	177

Chapter 12	
Biomass: Overview	183
Chapter 13	
Ethanol	189
Introduction.....	189
Ethanol in Texas	190
Costs and Benefits.....	197
Other States and Countries	205
Outlook for Texas.....	205
Chapter 14	
Biodiesel.....	211
Introduction.....	211
Biodiesel in Texas.....	213
Costs and Benefits.....	215
Other States and Countries	220
Outlook for Texas.....	222
Chapter 15	
Wood.....	227
Introduction.....	227
Wood Biomass in Texas	227
Costs and Benefits.....	230
Other States and Countries	233
Outlook for Texas.....	233
Chapter 16	
Feedlot Biomass.....	237
Introduction.....	237
Feedlot Biomass in Texas	238
Costs and Benefits.....	242
Other States and Countries	244
Outlook for Texas.....	244
Chapter 17	
Landfill Gas	247
Introduction.....	247
Landfill Gas in Texas	249
Costs and Benefits.....	251
Other States and Countries	252
Outlook for Texas.....	253
Chapter 18	
Municipal Waste Combustion	257
Introduction.....	257
Municipal Waste Combustion in Texas.....	258
Costs and Benefits.....	260
State and Federal Oversight.....	261
Other States and Countries	262
Outlook for Texas.....	262

Chapter 19	
Hydropower	265
Introduction.....	265
Hydropower in Texas	266
Costs and Benefits.....	268
Other States and Countries	269
Outlook for Texas.....	270
Chapter 20	
Ocean Power	273
Introduction.....	273
Ocean Power in Texas.....	273
Costs and Benefits.....	276
Other States and Countries	277
Outlook for Texas.....	278
Chapter 21	
Geothermal	281
Introduction.....	281
Geothermal in Texas.....	281
Costs and Benefits.....	285
Other States and Countries	286
Outlook for Texas.....	286
Chapter 22	
Hydrogen	289
Introduction.....	289
Hydrogen in Texas.....	291
Costs and Benefits.....	298
Other States and Countries	299
Outlook for Texas.....	300
Chapter 23	
Efficiency and Conservation	305
Introduction.....	305
Energy Efficiency in Texas.....	308
Costs and Benefits.....	315
Transportation Efficiency	316
Environmental Impact.....	318
Barriers to Efficiency.....	319
Outlook for Texas.....	319
Chapter 24	
Overview: Energy Uses.....	323
Energy Use Today.....	323
Chapter 25	
Direct Heat.....	325
Introduction.....	325
Fuel Sources and Usage.....	325
Trends and Outlook.....	327

**Chapter 26**

Transportation	329
Introduction.....	329
Fuel Sources and Usage.....	329
Oil Production and Consumption	330
Trends and Outlook.....	332
Government	334
Auto Industry	335
Consumers.....	336

Chapter 27

Electricity.....	339
Introduction.....	339
Power Generation	340
Transmission and Distribution.....	341
Retail Sales.....	344
Power Control and Reliability	345
North American Electric Reliability Councils	346
North American Electric Grids.....	347
ERCOT.....	347
Regulation and Oversight.....	351
Industry Structure	352
Electricity Rates	354
Deregulation	354
The Competitive Market	356
The Outlook for Electricity	358

Chapter 28

Government Financial Subsidies.....	367
Introduction.....	367
What are Governmental Financial Energy Subsidies?.....	367
Previous Energy Subsidy Studies	367
Comptroller's Energy Subsidy Study.....	368
Federal Energy Subsidies	368
Texas State and Local Energy Subsidies.....	369
Total Federal Subsidies by Fuel Source	371
Total Consumer Spending at the Federal Level.....	371
Texas State and Local Energy Subsidies.....	371
Texas Consumer Spending at State and Local Levels	371
Federal, State and Local Subsidies as a Percent of Consumer Spending	371
Spending on Nonrenewable Energy.....	373
Detail: Oil and Gas Subsidies	373
Detail: Coal Subsidies	380
Detail: Nuclear Subsidies.....	381
Spending on Renewable Energy	383
Detail: Ethanol Subsidies.....	383
Detail: Biodiesel Subsidies	386
Detail: Wind Subsidies	387
Detail: Solar Subsidies	389
Detail: Hydroelectric Power Subsidies	391
Detail: Biomass Subsidies	392
Detail: Geothermal Subsidies	394
Conclusion	395

Chapter 29	
Conclusion	403
Chapter 30	
For Further Information.....	405
General U.S. Government Energy Web Sites	405
Crude Oil.....	405
Liquefied Petroleum Gas (LPG).....	406
Natural Gas.....	406
Coal.....	406
Nuclear Energy	407
Solar Energy	408
Wind Energy	408
Ethanol	409
Biodiesel.....	410
Wood	410
Feedlot Biomass.....	411
Landfill Gas.....	412
Municipal Waste Combustion	412
Hydroelectricity	412
Ocean Power.....	413
Geothermal Energy.....	414
Hydrogen	415
Efficiency and Conservation	416
Direct Use.....	417
Transportation	417
Electricity	418
Subsidies Across Fuel Sources.....	418
Subsidies Related to Oil and Gas	419
Subsidies Related to Renewables.....	419
Chapter 31	
Glossary of Energy Terms	421
Chapter 32	
Appendix 1: The Electricity Market.....	431
Bilateral Market.....	431
Balancing Market.....	431
Ancillary Services.....	432
Transmission Congestion Management	433
Nodal Pricing.....	433
Chapter 33	
Appendix 2: Methodology for Estimating Subsidy Support.....	435
Estimate Scope	435
Methodology	435
Methodology for Estimating Texas Tax Subsidies	435
Acknowledgments.....	437
Contributors	441